

[Ozone: Science & Engineering >](#)

The Journal of the International Ozone Association

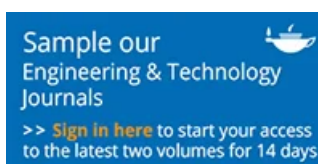
[Latest Articles](#)72 | 0 | 0
Views | CrossRef citations to date | Altmetric

Research Article

Dissociation Kinetics of Gaseous Ozone in Onion (*Allium Cepa* L.) Bulbs

Pramod S. Shelake, [Debabandya Mohapatra](#)  , Saroj kumar Giri & Subir kumar Chakraborty

Received 05 Sep 2022, Accepted 08 Mar 2023, Published online: 04 Apr 2023

 [Cite this article](#)  <https://doi.org/10.1080/01919512.2023.2195437> [Check for updates](#)[Full Article](#) [Figures & data](#) [References](#) [Supplemental](#) [Citations](#) [Metrics](#)[Reprints & Permissions](#) [Read this article](#)

ABSTRACT

Ozone decomposition kinetics varies significantly in the presence of biological commodity. This variation depends on many factors but primarily on the active sites in agricultural commodities and storage environments. Ozone decomposition kinetics in onion bulbs at temperatures (2, 10, and 18°C) and relative humidity (RH) (35 & 85%) for different ozone concentrations (100, 200, 300 ppm) and number of exposures (1, 2, 3) were investigated. Zero-order, first-order, and second-order kinetic models were fitted to the ozone decomposition data with respect to time. It was found that the decomposition kinetics follows a first-order reaction and the decomposition rate constant (k_d) varies from $1.712 \times 10^{-3} \text{ s}^{-1}$ – $5.181 \times 10^{-3} \text{ s}^{-1}$ in the presence of onion. The half-life period ($t_{1/2}$) was found to increase with concentration and number of exposures and decrease with temperature and relative humidity. The activation energy was found to vary between 1.840 and 10.216 kJ mole^{-1} and 6.271–12.461 kJ mole^{-1} for the relative humidity of 85% and 35%, respectively.

KEYWORDS: *Activation energy* *Decomposition* *Gaseous ozone* *Onion* *Temperature*[< Previous article](#)[View latest articles](#)[Next article >](#)

Acknowledgments

[Home](#) ▶ [All Journals](#) ▶ [Ozone: Science & Engineering](#) ▶ [List of Issues](#) ▶ [Latest Articles](#)

▶ [Dissociation Kinetics of Gaseous Ozone i ...](#)

of Science and Technology (DST), Govt. of India, for carrying out the Ph.D. research work at ICAR-CIAE, the outreach program of PG school IARI.

Disclosure statement

No potential conflict of interest was reported by the authors.

Supplementary material

Supplemental data for this article can be accessed online at

<https://doi.org/10.1080/01919512.2023.2195437>

Additional information

Funding

The work was supported by the Department of Science and Technology India [DST-Inspire fellowship (IF180395)].

Related research

Recommended articles 

People also read

Cited by

[Mulching-Induced Alteration of Microclimatic Parameters on the Morpho-Physiological Attributes in Onion \(*Allium cepa L.*\)](#) >

Shahidur Rahman et al.

Plant Production Science

Published online: 3 Dec 2015

[EFFECT OF TEMPERATURE ON WATER SORPTION EQUILIBRIUM OF ONION \(ALLIUM CEPA L\)](#) >

E. Adam et al.

Drying Technology

Published online: 10 May 2007

[Malonylated Anthocyanins from Bulbs of Red Onion, *Allium cepa L.*](#) >

Norihiko Terahara et al.

[View more](#)

[Home](#) ▶ [All Journals](#) ▶ [Ozone: Science & Engineering](#) ▶ [List of Issues](#) ▶ [Latest Articles](#)

▶ [Dissociation Kinetics of Gaseous Ozone i ...](#)

[Authors](#)

[R&D professionals](#)

[Editors](#)

[Librarians](#)

[Societies](#)

[Opportunities](#)

[Reprints and e-prints](#)

[Advertising solutions](#)

[Accelerated publication](#)

[Corporate access solutions](#)

[Open access](#)

[Open journals](#)

[Open Select](#)

[Dove Medical Press](#)

[F1000Research](#)

[Help and information](#)

[Help and contact](#)

[Newsroom](#)

[All journals](#)

[Books](#)

Keep up to date

Register to receive personalised research and resources by email

 [Sign me up](#)



[Copyright © 2023 Informa UK Limited](#) [Privacy policy](#) [Cookies](#) [Terms & conditions](#) [Accessibility](#)

Registered in England & Wales No. 3099067
5 Howick Place | London | SW1P 1WG


Taylor & Francis Group